1. ELECTRICAL SPECIFICATIONS

Accuracy is indicated as ± (% readings + no. of digits) at 23°C ± 5°C, con relative humidity <75%HR

Continuity test on earth protection cables with 200mA

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷19.99	0.01	±(2.0% rdg + 2dgt)

(*) After cable calibration (which eliminates the cable resistance)

Test current: > 200mA DC (calibration included)
resolution on current measurement: 1mA

Open voltage: >4.5VDC

Continuity test with 10A

Range (Ω)	Resolution (Ω)	Accuracy
0.001 ÷ 0.499	0.001	±(2.0% rdg + 2dgt)

Test current: >10A CA
Resolution on test current: 0.1A
Open voltage: <12V CA
Power supply: 230V – 50Hz
Measurement method: 4 wires

Voltage drop test with 10A

Range (V)	Resolution (V)	Accuracy
0.01 ÷ 11.99	0.01	±(2.0% rdg + 2dgt)

Test current: >10A CA
Resolution on test current: 0.1A
Open voltage: <12V CA
Power supply: 230V – 50Hz
Measurement method: 4 wires

DC Insulation resistance

Test voltage (V)	Range (MΩ)	Resolution (MΩ)	Accuracy
250, 500, 1000	0.001 ÷ 1.999	0.001	±(2.0% rdg + 2dgt)
	2.000 ÷ 19.99	0.01	
	20.0 ÷ 199.9	0.1	

Test voltage: 250, 500, 1000VDC
Short circuit current: <1.4mA (250V), 2.6mA (500V), 1.4mA (1000V)
Nominal current: 1mA (250V), 2.2mA (500V), 1mA (1000V)

RCDs trip out time

Range (ms)		Resolution (ms)	Accuracy
½ $I_{\Delta N}$, $I_{\Delta N}$	1÷999	1	±(2.0% rdg + 2ms)
2 $I_{\Delta N}$	1÷199 general		
	1÷199 selective		
5 $I_{\Delta N}$ RCD	1÷ 49 general		
	1÷149 selective		

Nominal trip our current: 10mA, 30mA, 100mA, 300mA, 500mA, 1000mA
Type of RCD: AC, A, B General and Selective
Voltage Phase-Ground: 100V ÷ 250V
Frequency: 45Hz ÷ 65Hz

RCDs trip out current (RCD type AC, A, B)

Type of RCD	Range IΔN (mA)	Resolution (mA)	Accuracy IΔN
AC, A	(0.4 ÷ 1.4) $I_{\Delta N}$	0.1 $I_{\Delta N}$	±0.15$I_{\Delta N}$)
B	(0.4 ÷ 2.1) $I_{\Delta N}$		

Voltage contact Ut

Range (V)	Resolution (V)	Accuracy
10 ÷ 50 (Ut = 25V)	0.1	-0%, +(10.0% rdg)
10 ÷ 100 (Ut = 50V)		

Utlim: 25V , 50V
Nominal voltage: 100V ÷ 250V
Frequency 45Hz ÷ 65Hz

Line / Loop Impedance (P-P, P-N, P-PE)

Range (Ω)	Resolution (Ω)	Accuracy
0.01 ÷ 19.99	0.01	±(2.0% rdg + 2dgt)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

Nominal voltage: 100÷440V (Max 440V Phase-Phase)
Frequency: 45Hz ÷ 65Hz

Line / Loop Impedance (P-P, P-N, P-PE) with high resolution Z2Ω

Range (mΩ)	Resolution (mΩ)	Accuracy
0.1 ÷ 199.9	0.1	±(2.0% rdg + 2mΩ)
200 ÷ 1999	1	

Test current: 280A max
Nominal voltage: 100÷440V (Max 440V Phase-Phase)
Frequency: 45Hz ÷ 65Hz

Global earth resistance R_E without RCDs tripping

$I_{\Delta N}$ (mA)	Range (Ω)	Resolution (Ω)	Accuracy
10	1 ÷ 1999	1	-0%, +(10.0% rdg + 20Ω)
30			-0%, +(10.0% rdg + 7Ω)
100	0.1 ÷ 999.9	0.1	-0%, +(10.0% rdg + 2Ω)
300	0.1 ÷ 199.9		-0%, +(10.0% rdg + 0.7Ω)
	200.0 ÷ 332.9		
500	0.1 ÷ 199.9		-0%, +(10.0% rdg + 0.4Ω)
1000	0.1 ÷ 99.9		-0%, +(10.0% rdg + 0.2Ω)

Test current: 0.4 $I_{\Delta N}$
Nominal voltage: 100÷250V
Frequency: 45Hz ÷ 65Hz

Earth resistance 2-wire, 3-wire

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷ 19.99	0.01	±(2.0% rdg + 2dgt)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

Test current: <10mAAC
Test frequency: 125Hz ±1Hz
Open voltage: <65Vrms
Waveform: sinusoidal

Ground resistivity

Range ρ (Ωm)	Resolution (Ωm)	Accuracy
0.01 ÷ 19.99	0.01	±(2%rdg+2πa·0,02Ω); $\frac{\rho}{2\pi a} \leq 19{,}99\Omega$
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	±(2%rdg+2πa·0,2Ω);19,99Ω< $\frac{\rho}{2\pi a} \leq 199{,}9\Omega$
2.00k ÷ 19.99k	10	
20.0k ÷ 199.9k	100	
200k ÷ 377k	1000	±(2% rdg + 2πa·2Ω); 199,9Ω < $\frac{\rho}{2\pi a}$

Range distance d: 1 ÷ 30m
Test current: <10mAAC
Test frequency: 125Hz ±1Hz
Open voltage: <65Vrms
Waveform: sinusoidal

Voltage (RCD, Loop, Phase sequence)

Range (V)	Resolution (V)	Accuracy
100 ÷ 440	1	±(2.0% rdg + 2dgt)

Frequency

Range (Hz)	Resolution (Hz)	Accuracy
45.0 ÷ 65.0	0.1	±(0.1% rdg + 1dgt)

Line voltage drop ΔU%

Range (ΔU%)	Resolution (%)	Accuracy
0.1 ÷ 20	0.1	±1cifra

Range U1, U2 (V)	Resolution (V)	Accuracy
100 ÷ 440	0.1	±(2.0% rdg + 2dgt)

Nominal voltage: 100÷440V (Max 440V Phase-Phase)
Frequency: 45Hz ÷ 65Hz

2. GENERAL SPECIFICATIONS

DISPLAY, MEMORY, SERIAL INTERFACE:	
Features:	Dot matrix with backlight
Resolution:	240x64pxls
Visibile area:	127x34 mm
Memory:	ca 800 measure
RS-232 interface:	9 pin, 4800 baud
POWER SUPPLY:	
Batteries:	4 batteries 1.5V type IEC LR20
Life batteries:	ca 300 hours
MECHANICAL FEATURES:	
Dimensions:	450 (L)x350(La)x130(H) mm
Peso (included batteries):	about 8.5kg
WORKING ENVIRONMENTAL CONDITIONS:	
Reference temperature:	23°C ± 5°C
Working temperature:	0° ÷ 40°C
Allowed relative humidity:	< 80% HR
Storage temperature:	-10 ÷ 60°C
Storage humidity:	< 80% HR
TEST VERIFIES REFERENCE STANDARDS:	
Continuity test with 200mA:	IEC 61557-4
Insulation resistance:	IEC 61557-2
Earth resistance:	IEC 61557-5
Fault Loop Impedance:	IEC 61557-3
RCDs test:	IEC 61557-6
Phase sequence:	IEC 61557-7
Continuity test with 10A:	EN60439-1, EN60204-1
GENERAL REFERENCE STANDARDS:	
Safety of measuring instruments:	EN61010-1 + A2(1997)
Product type standard:	IEC61557-1, 2, 3, 4, 5, 6
Insulation:	class 2 (double insulation)
Pollution degree:	2
Overvoltage category:	CAT II 600V~ (Z2Ω function) CAT III 600V~ (other functions)
Use:	internal use; max altitude: 2000m
EMC:	EN61326-1 (1998) + A1 (1999)

This instrument complies with the requirements of the European Low Voltage Directives 2006/95/EEC (LVD) and EMC 2004/108/EEC